Congaree Bluff Air Monitoring Site Ozone Exceedance March 29, 2007

The Congaree Bluff air monitoring site (45-079-0021) is operated by the SC DHEC Division of Air Quality Analysis within the boundary of Congaree National Park near Gadsden, SC. Periodically, areas of the Park are burned to restore and maintain the fire-dependent upland bluff vegetation, encouraging the restoration of the original Longleaf pine forest and reducing fuel loadings through the reduction of underbrush and leaf litter. The benefits of the prescribed burns include restoration of the natural ecosystem, improved habitat for the endangered Red-cockaded woodpecker and reduction of fire danger to park structures and adjacent lands.

A prescribed fire was conducted in two sections of the Park on March 29, 2007. The westernmost boundary of Burn Unit 5 was less than 50 feet than from the air monitoring site. The attached email confirmed to the Division of Air Quality Analysis the NPS was conducting a prescribed burn at the time the elevated concentrations were noted.

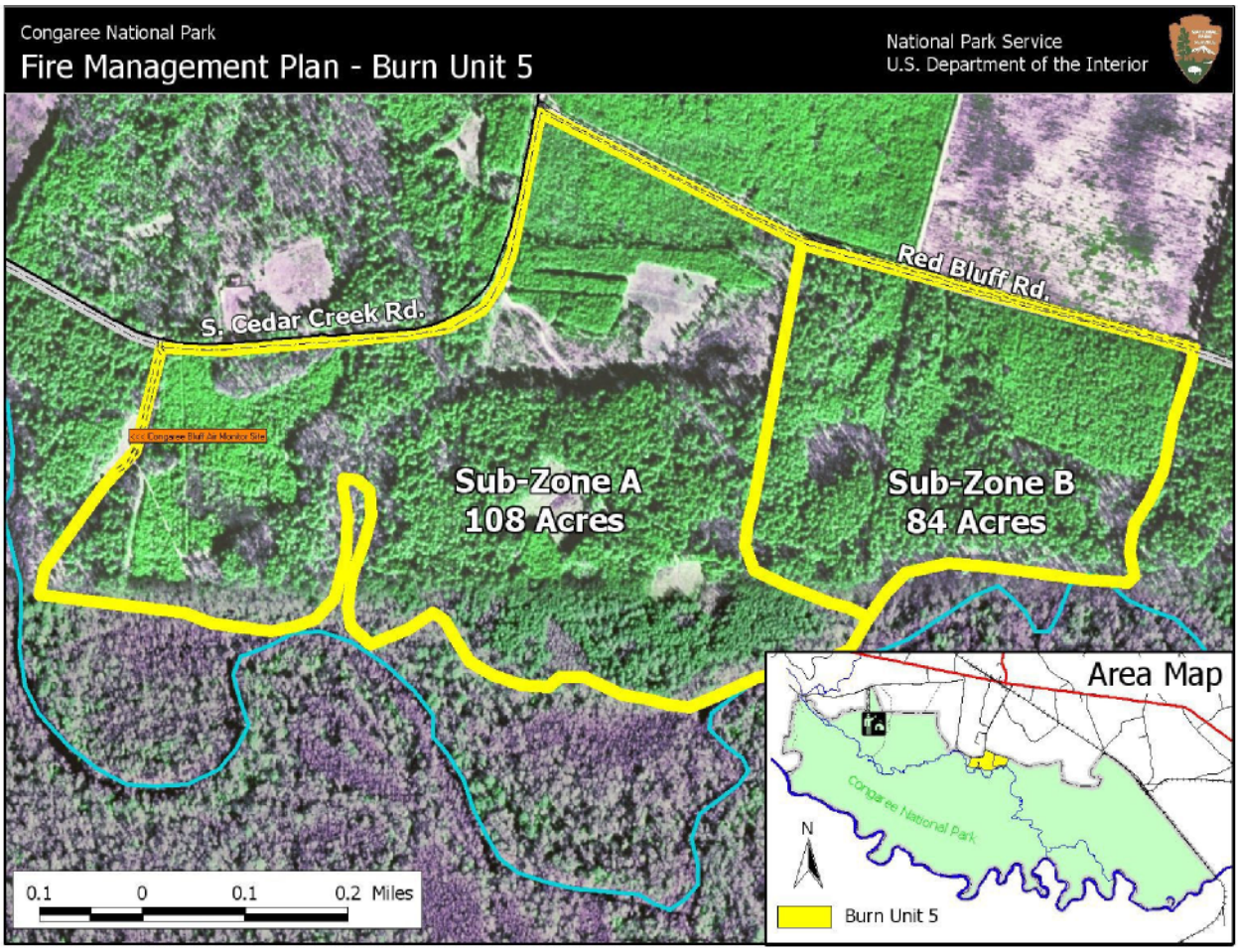


Figure 1 March 29 prescribed burn area

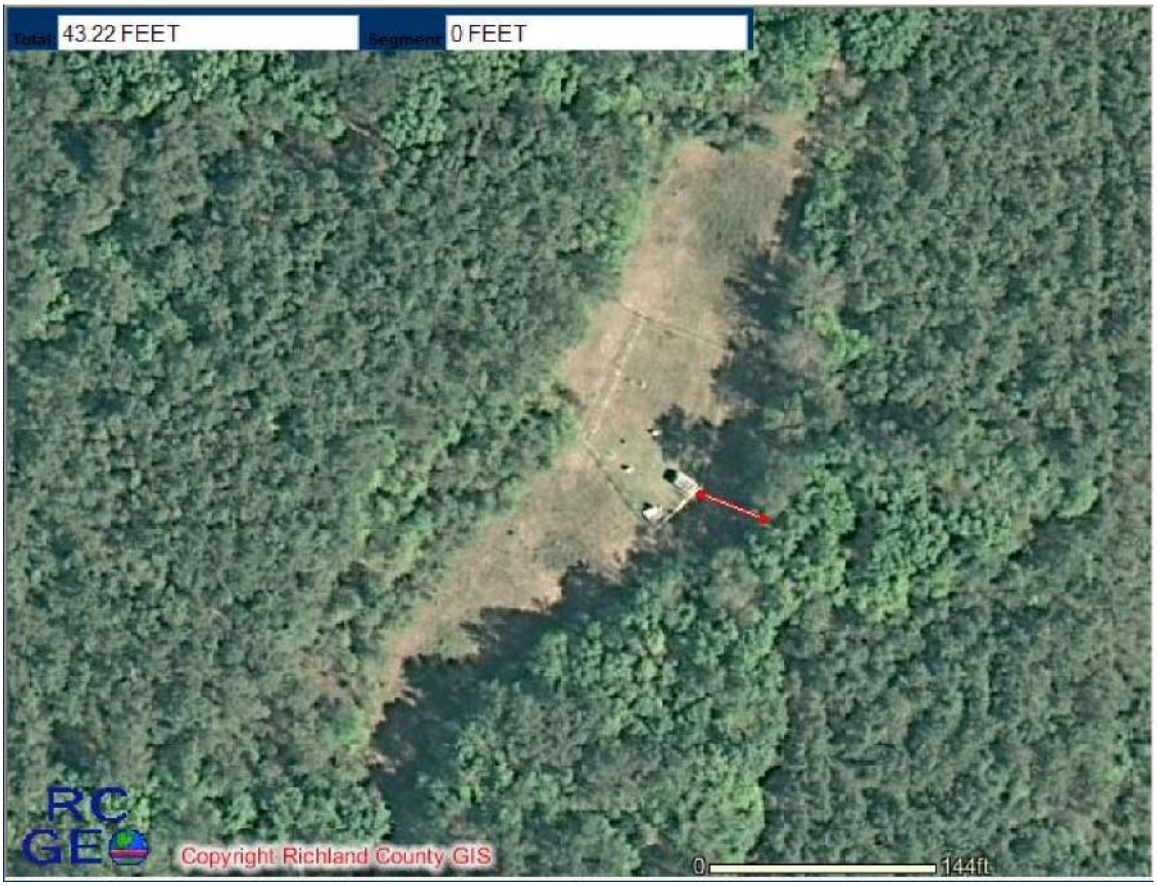


Figure 2 Monitoring site location

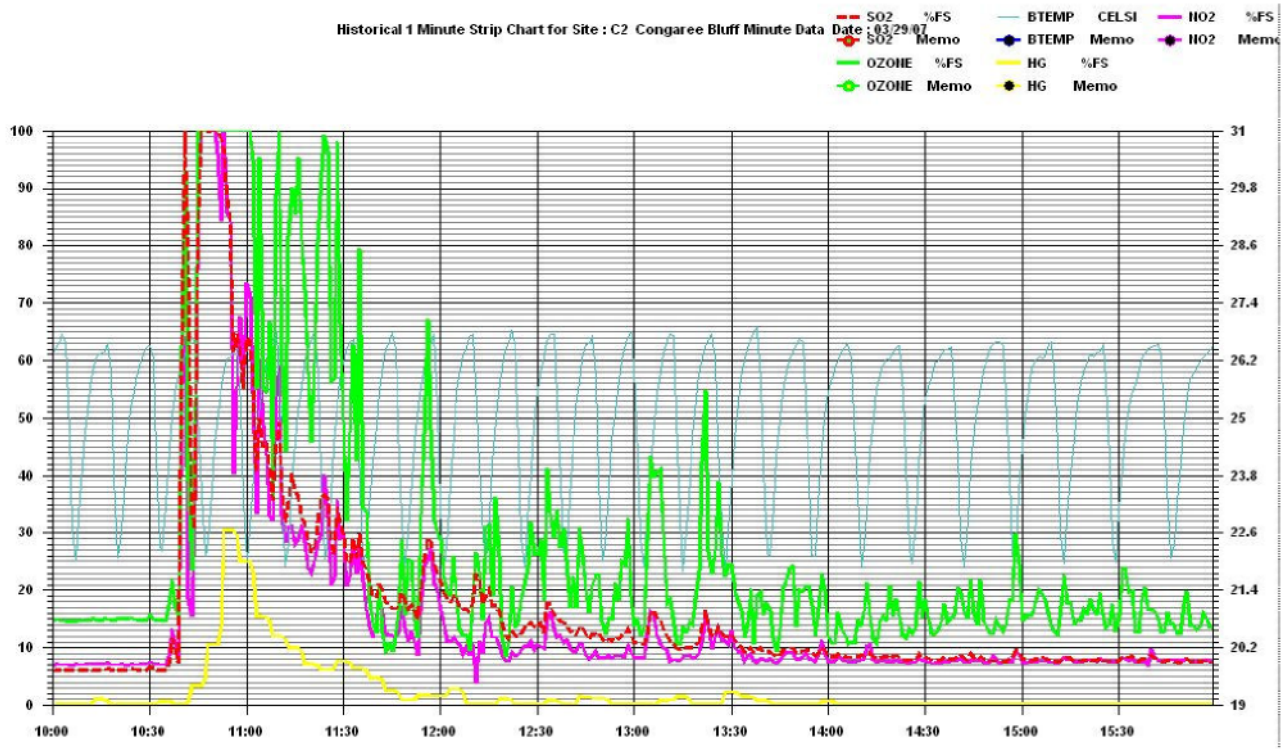


Figure 3 Raw data during prescribed burn impact

As the prescribed fire approached Burn Unit boundary and monitor site, all parameter concentrations being monitored spiked, commencing at approximately 10:45 AM and remaining elevated and erratic until around 2:00 PM. The ozone concentration measurements continued to be erratic until end of the day.

The ozone one-hour average concentration peaked at 237 ppb at 1100[1] EST. The Ozone monitor measurements were offscale from 1045 until 1101 AM EST, so the actual average concentration for 1000 was likely higher than the reported one hour average of 181 ppb. Forty-five minutes (75%) of the measurements made during the hour were valid, so the one hour average was verified to be a valid, reportable measurement. The maximum 8-hour average for the day 91 was ppb, which is an exceedance of the National Ambient Air Quality Standard for Ozone.

	SO2	%FS	OZONE	%FS	BTEMP	CELSI	HG	%FS	NO2	%FS
10:30		6.561		15.606		26.517		0.071		7.476
10:31		6.458		15.087		26.258		0.034		7.444
10:32		6.125		14.738		24.213		0.124		7.042
10:33		6.045		14.768		22.302		0.571		7.046
10:34		6.036		14.737		22.209		0.57		7.008
10:35		6.07		14.727		23.194		0.572		7.01
10:36		7.221		17.4		24.317		0.607		8.564
10:37		11.74		21.692		25.084		0.515		13.283
10:38		9.713		17.223		25.668		0.038		10.683
10:39		7.21		15.105		25.909		0.037		7.432
10:40		58.856		62.555		26.028		0.037		56.2
10:41		99.906		93.051		26.354		0.039		64.121
10:42		80.188		39.137		26.495		0.587		18.676
10:43		33.555		23.246		26.701		3.369		15.319
10:44		30.523		52.797		26.566		3.37		36.254
10:45		82.833		99.926		25.092		3.334		95.473
10:46		99.903		99.926		23.422		3.333		100.883
10:47		99.906		99.926		22.105		4.522		100.885
10:48		99.904		99.925		22.405		10.456		100.02
10:49		99.906		99.925		23.462		10.453		100.884
10:50		99.905		99.926		24.433		10.487		100.885
10:51		99.906		99.925		25.082		10.492		96.126
10:52		98.978		99.926		25.526		13.774		84.168
10:53		97.112		99.926		26.001		30.385		100.818
10:54		88.636		99.926		26.225		30.386		85.86
10:55		84.579		99.926		26.289		30.39		84.223
10:56		61.315		99.926		26.364		30.387		40.234
10:57		64.655		99.926		26.52		29.509		55.424
10:58		62.382		99.926		25.253		24.983		67.686
10:59		55.047		99.926		23.23		24.943		55.282
11:00		63.85		99.925		22.003		24.943		73.481
11:01		63.495		99.926		22.695		24.944		71.239
11:02		58.07		94.852		23.802		23.336		54.43
11:03		40.511		54.969		24.741		15.291		33.229
11:04		50.019		95.344		25.259		15.322		60.154

03/29/07 00 Load Data Sc 01

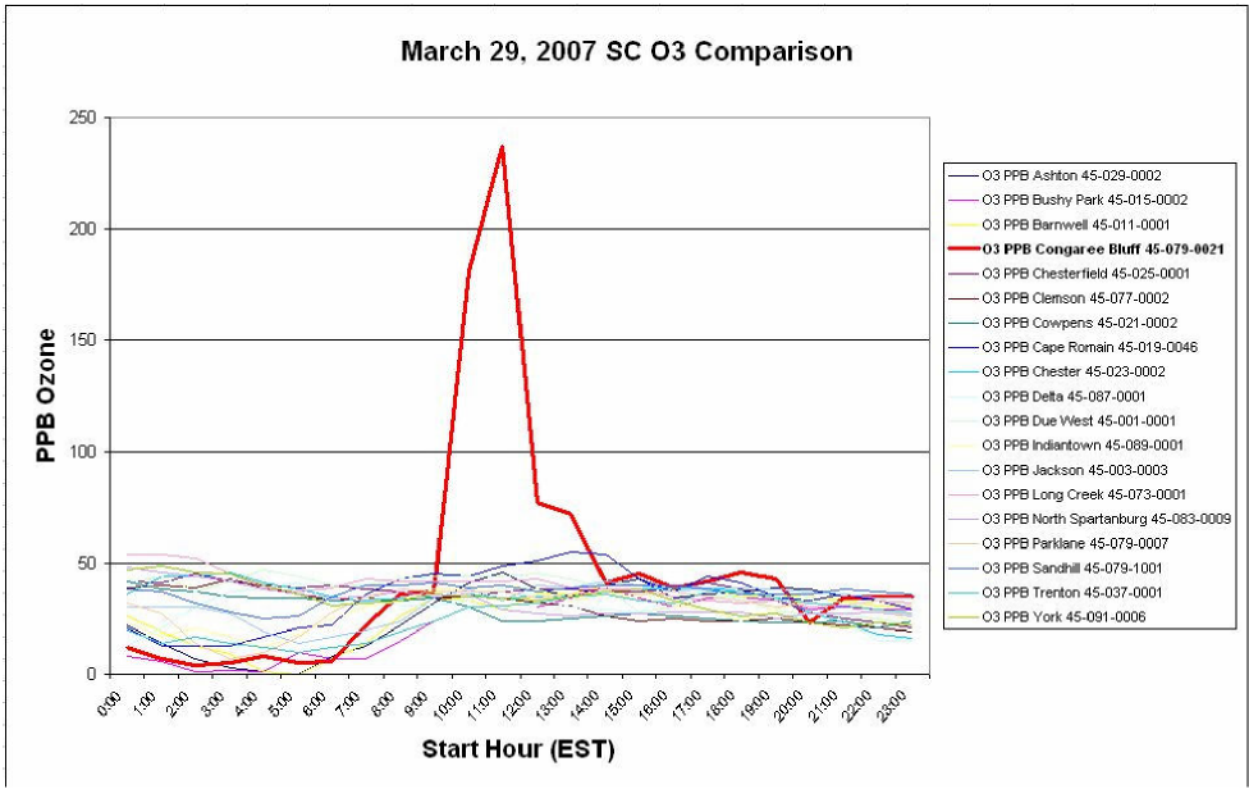
Figure 4 Congaree Criteria Monitor Percent Full Scale- March 29, 2007

[1] Ambient pollution measurements are reported in the EPA Air Quality System (AQS) national database associated with the start hour of the measurement. The average for the period from 1100-1200 EST is reported for hour 1100.

NO_2 and SO_2 readings also were briefly offscale between 1030 and 1100. Concentrations of these pollutants exhibited the concurrent impact of the prescribed fire, but did not exceed the level of the National Ambient Air Quality Standards.

Audits performed after the prescribed burn confirmed that the monitors were operating correctly during the period and data was valid.

The high concentrations reported existed only in the immediate vicinity of the prescribed fire, and measurements at all other area ozone monitors were significantly lower and consistent with what is typically recorded for the season and meteorological conditions. The graph below illustrates the hourly ozone concentrations for all of the ozone monitors in SC. The Congaree Bluff data shows the magnitude of the impact of the local prescribed burn.



The tables below show the ozone concentrations at the Congaree monitor compared to all the ozone concentrations at all of the other sites ozone sites for the same period of time on March 29, 2007. The first table compares the hourly ozone concentrations at each ozone monitor. As seen below, the hourly ozone concentrations at Congaree spike up to 237 ppb while all of the other ozone monitors show low ozone concentrations. The same is true for the 8hr ozone concentrations derived from the one hour averages in the second table. The Congaree Bluff maximum 8hr ozone concentration reaches 91 ppb while all of the other area ozone concentrations stay near or below 48 ppb, typical for the season and region. There were no long or short term air

Current Date : 07/03/07
Current Time : 13:48

Frequency Distribution Report - Validated DataBase
Environmental Systems Corporation

03/29/07

Parameter : OZONE Average Interval : 01 Maximum Samples : 24

Site Name	Number Samples	Distribution (Percentages) Min.	10.00	30.00	50.00	70.00	90.00	95.00	98.00	99.00	Max.	Arith. Mean	Geo. Mean	Geo. Dev.
ASHTON	24	0	1	14	33	37	41	43	46	46	46	26	21*	2*
BUSHY PK	22	1	1	8	29	30	34	35	39	39	39	21	14	3
BARNWELL	24	0	1	19	31	35	39	40	40	40	40	26	22*	2*
BLUFF	24	4	5	12	35	42	77	181	237	237	237	35	26	2
C_FIELD	24	21	23	35	38	39	42	42	45	45	45	36	35	1
CLEMSON	24	19	21	24	32	34	39	40	43	43	43	30	29	1
COWPENS	24	21	23	24	26	33	37	38	42	42	42	29	28	1
CROMAIN	24	13	13	22	36	43	51	54	55	55	55	34	31	1
CHESTER	24	16	18	34	35	38	44	44	46	46	46	34	33	1
DELTA	24	13	15	29	32	35	39	39	41	41	41	30	29	1
DUE WEST	24	22	25	30	40	43	44	45	47	47	47	37	36	1
ITOWN	24	12	17	24	29	33	38	38	40	40	40	28	27	1
JACKSON	24	14	17	30	34	38	40	40	42	42	42	32	30	1
LCREEK	24	30	31	33	39	42	52	54	54	54	54	39	38	1
NSFS	24	25	26	27	28	36	44	46	48	48	48	32	32	1
PEEDEE	24	22	24	32	34	36	39	39	40	40	40	32	32	1
PARKLANE	24	7	10	30	33	36	37	37	38	38	38	30	28	1
SANDHILL	24	25	26	36	37	39	40	40	41	41	41	36	36	1
TRENTON	24	10	12	17	29	32	36	37	37	37	37	25	23	1
YORK	24	21	22	29	33	36	46	47	49	49	49	33	32	1

NOTE : Negative data values found. The Geometric Mean and Geometric Standard Deviation does not include any values less than zero. These values are marked by an '*'.

Current Date : 07/03/07
Current Time : 13:48

Frequency Distribution Report - Validated DataBase
Environmental Systems Corporation

03/29/07

Parameter : OZONE Average Interval : 08 Maximum Samples : 24

Site Name	Number Samples	Distribution (Percentages) Min.	10.00	30.00	50.00	70.00	90.00	95.00	98.00	99.00	Max.	Arith. Mean	Geo. Mean	Geo. Dev.
ASHTON	24	8	8	28	32	36	38	38	39	39	39	29	26	1
BUSHY PK	24	5	6	19	28	31	33	33	33	33	33	24	21	1
BARNWELL	24	11	11	26	32	34	36	37	37	37	37	28	26	1
BLUFF	24	8	11	27	37	66	90	91	91	91	91	47	39	1
C_FIELD	24	17	18	28	36	37	39	40	40	40	40	32	31	1
CLEMSON	24	20	20	22	26	32	36	37	37	37	37	27	26	1
COWPENS	24	18	19	23	25	28	34	34	35	35	35	25	25	1
CROMAIN	24	19	22	30	34	42	47	47	48	48	48	35	34	1
CHESTER	24	18	18	26	34	36	38	39	39	39	39	31	30	1
DELTA	24	17	17	26	32	33	34	34	35	35	35	28	28	1
DUE WEST	24	24	24	27	35	41	43	43	43	43	43	34	33	1
ITOWN	24	17	20	24	29	31	35	36	36	36	36	28	27	1
JACKSON	24	22	23	30	35	36	38	38	39	39	39	32	32	1
LCREEK	24	31	31	32	36	40	42	43	45	45	45	36	36	1
NSFS	24	20	22	26	27	31	37	39	40	40	40	29	28	1
PEEDEE	24	15	17	29	33	34	35	36	36	36	36	30	29	1
PARKLANE	24	21	21	26	31	34	36	36	36	36	36	30	29	1
SANDHILL	24	26	28	33	36	38	39	39	39	39	39	35	34	1
TRENTON	24	14	14	24	28	31	34	34	34	34	34	26	25	1
YORK	24	21	22	24	32	34	37	39	40	40	40	30	29	1

stagnations, inversions or meteorological events that contributed to the concentrations recorded at the site.

The State of South Carolina has an approved Smoke Management Plan. The National Park Service uses documented and well established fire policy[2] in the planning

[2] http://www.nps.gov/fire/fire/fir_wil_planningandpolicy.cfm

and administration of fire use that is consistent with the National Environmental Policy Act.

All data at the Congaree Bluff ambient monitoring site that has been determined to be significantly impacted by the local prescribed burn has been qualified in AQS through the application of the most appropriate available flag. The Ozone data has been flagged with the “E” (Forest Fire) data qualifier because AQS, for ozone, will not accept the “Q” flag (Prescribed Burning), which we believe would be more appropriate.

The South Carolina Department of Health and Environmental Control Air Program is requesting concurrence from US EPA, Region 4 that the affected Ozone data should be excluded from consideration for regulatory purposes. The ozone data for which concurrence is requested meets all the criteria described in 40 CFR §50.14 for the Treatment of air Quality Monitoring data influenced by exceptional events.

- The event affects air quality

  The prescribed burn immediately adjacent to the ambient monitoring site had an immediate and significant impact on the pollutant concentrations at the site. The proximity, timing and the measurements of all parameters are consistent with direct impact of emissions associated the activity. The prescribed burn was the direct cause of the exceedance of the National Ambient Air Quality Standard for Ozone recorded on March 26, 2007

- The event was not reasonably controllable or preventable

  Restoration and management of the Congaree National Park’ natural fire -dependent ecosystem requires the use of prescribed fire to achieve the resource management goals. Manual or mechanical methods of fuel reduction can be used where appropriate but the ecosystem is highly dependent on a natural fire return interval to maintain a sustainable natural species composition. The use of fire as a management tool in the Park is not reasonably controllable or preventable.

- The event was caused by human activity that is unlikely to recur at a particular location.

  Inherent in the definition of prescribed fire is the causal connection to human activity. Although the use of prescribed fire will continue to be necessary to the maintenance of the Congaree National Park resources, the historical record of monitoring within the Park and the record of this event indicate that impact on air quality, and in particular on the ambient monitors, is rare (no other Congaree data has been flagged due to fire impact since monitoring began in December 1999), brief (only 2 hours were significantly impacted), easily identifiable (the NPS has a well established fire management system) and are most likely to occur when ambient concentration are unlikely to be high and potential contribution to area ambient concentrations is minimized (early spring).It is reasonable to conclude that the type of impacts recorded on March 29, 2007 are unlikely to recur.

Email received by SC DHEC, Division of Air Quality Analysis confirming prescribed burn

From: <Bill_Hulslander@nps.gov>
To: <DENNISSC@dhec.sc.gov>
Date: Thursday, March 29, 2007 17:05:4
Subject: Re: Fw: South Cedar Creek Road burn!

The prescribed burn at Congaree National Park was initiated this was morning at Approximately 11:00 am. It includes burn units #5and #6 (see attached maps) totaling approximately 384 acres.

(See attached file: burn_unit_6.jpg)(See ile: burn_unit_5.jpg)
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